

# SIRIUS XM

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Via Electronic Delivery

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, DC 20554

Re: Written *Ex Parte* Presentation WT Docket No. 07-293; IB Docket No. 95-91.

Dear Ms. Dortch:

The WCS Coalition has filed a letter questioning the legitimacy of a video recently distributed by Sirius XM Radio Inc. (“Sirius XM”) that depicts interference to satellite radio receivers caused by devices operating in conformance with the staff’s proposed rule changes for Part 27 WCS service.<sup>1</sup> While conceding that it has no specific knowledge of how the equipment in the video was set-up and operated, the WCS Coalition nonetheless asserts that “the simulated WCS operations shown in the video were not designed or implemented to portray how an actual WCS system will perform, but instead were designed and implemented to maximize potential interference.”<sup>2</sup>

The Sirius XM video was created using good engineering practices to generate WiMAX based emissions that fully conform with the occupied bandwidth, transmit power, out-of-band emissions and duty cycle limits proposed for WCS mobile devices in the recently released public notice.<sup>3</sup> Sirius XM generated the WCS test signal using the same procedures and equipment that

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<sup>1</sup> Letter from Paul J. Sinderbrand, Counsel to the WCS Coalition, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 95-91 (filed May 12, 2010).

<sup>2</sup> *Id.* at 1, 2.

<sup>3</sup> Commission Staff Requests that Interested Parties Supplement the Record on Draft Interference Rules for Wireless Communications Service and Satellite Digital Audio Radio Service, Public Notice, WT Docket No. 07-293, IB Docket No. 95-91, GEN Docket No. 90-357, RM No. 8610 (rel. Apr. 2, 2010) (“Staff Public Notice”)

Sirius XM previously described to the Commission.<sup>4</sup> Contrary to the assertions of the WCS Coalition, the victim satellite receiver used in the video is a typical aftermarket XM radio – a model currently used by millions of subscribers – of sound design, having similar interference rejection capabilities as other satellite radios.

In short, the video is a valid depiction of the type of interference that consumers will experience from WCS operations unless certain precautions are adopted. It demonstrates the same principles applied in the interference analysis from Prof. Theodore S. Rappaport of the University of Texas, which quantifies the significance of interference if the proposed changes for WCS mobile service are adopted.<sup>5</sup> Can WCS mobile devices operate in a manner that does not cause this level of interference to satellite reception? Absolutely and this is the point of the video. Indeed, the video depicts the result of a simple modification to the WCS transmission stream that does not affect network throughput or handset design while greatly reducing the concern of mobile-to-mobile interference to the satellite service.

Sirius XM's proposed solution was addressed in another *ex parte* pleading filed yesterday by WCS licensee, Horizon Wi-Com, LLC ("Horizon").<sup>6</sup> Horizon claims that its filing corrects technical statements made on the record by the WCS Coalition immediately following the 2009 joint demonstrations conducted in Ashburn, Virginia. At that time, the WCS Coalition took issue with how Sirius XM replicated a WiMAX based test signal in its tests, stating the following:<sup>7</sup>

While the Sirius XM tests were performed in the full C and D blocks, what was demonstrated did not represent was the true impact of a TDD network on their receivers. In an operating system you have a transmission followed by guard time, followed by a reception followed by guard time and then it is repeated as necessary. In order to accurately represent the actual behavior of a two way signal, SDARS should have modulated 5 ms followed by a 5 ms (or slightly more to accommodate guard time) off time followed by the next transmit frame. SDARS did not do this, but rather just burst the channel (or some subset of tones) 6, 12, or 25 % of the time. It appears that the Sirius XM showed nothing more than the effect of average power density, based on a duty cycle of a transient waveform. If done properly (modulated 5 ms followed by a 5 ms dead time) then

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<sup>4</sup> Comments of Sirius XM Radio Inc., WT Docket No. 07-293, IB Docket No. 95-91 (filed April 23, 2010) at Exhibit A, page 3 ("Sirius XM's April 23 Comments").

<sup>5</sup> Supplemental Comments of Sirius XM Radio Inc., WT Docket No. 07-293, IB Docket No. 95-91, (filed April 29, 2010).

<sup>6</sup> Letter from Thomas Gutierrez, Counsel for Horizon Wi-Com, LLC to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 95-91 (filed May 12, 2010) ("Horizon May 12 Letter").

<sup>7</sup> Letter from Mary N. O'Connor, Counsel to the WCS Coalition, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 95-91 (filed August 4, 2010) ("WCS Coalition's Ashburn Summary") at Exhibit B.

the test would have been a more accurate representation of the operation of a mobile device.

Over the past several weeks, Sirius XM has relied on this explanation to perform additional tests on the susceptibility of satellite radio receivers to WCS transmissions, with the knowledge that the total WiMAX frame is measured over 5 milliseconds.<sup>8</sup> As in Ashburn, these tests were performed using a commercially available WiMAX signal generator using industry-accepted profiles for uplink duty cycle with standard WiMAX frame protocols. In the video, as in our comments filed on April 23, the only variable was the repetition rate of transmissions in successive 5 millisecond frames. When mobile uplink transmissions occur in successive frames, the interference to satellite radio is devastating. When transmissions are inhibited in every other frame, the mobile-to-mobile interference resulting in satellite radio muting can be virtually eliminated. While there was no transparency as to the frequency of uplink transmissions in the WCS demonstration in Ashburn, this is the only scenario Sirius XM is able to identify that could explain the vastly different interference distances experienced in Ashburn demonstrations.

Horizon now claims that Sirius XM has “mischaracterized” the passage cited above and attributes the confusion to a “fleeting reference” where it “inartfully” referred to the portion of time in which a given device transmits as a “frame”.<sup>9</sup> Horizon goes on to say that as the discussion of “duty cycle” has evolved over this proceeding, the term “frame” has come to refer to the complete cycle of a base station transmissions, guard time, mobile transmissions and guard time. Citing a white paper recently prepared for the WCS Coalition by TeleWorld Solutions, Horizon says that in a WiMAX 802.16e system, a “frame” consists of four subframe elements (the base station transmission time, the transmit transition gap during which the system is silent, the mobile transmission time, and the receive transition gap during which the system is again silent) that total 5 milliseconds in length.<sup>10</sup>

Sirius XM has no confusion about the construction of the WiMAX frame and has always understood it to be composed of a complete cycle of base station transmissions, guard time, mobile transmissions and guard time. At Ashburn, our test signals followed this pattern and varied only by the amount of time that modulation occurred during the up-link sub-frame to account for different duty cycles being tested. We were subsequently told by the WCS Coalition that our recreation of the WiMAX transmission profiles was incorrect and that a period of uplink modulation should be followed by 5 millisecond of dead time. When we followed this advice, our tests began to approximate the results that we witnessed during the WCS Coalition’s Ashburn demonstrations. Sirius XM raised the discrepancy in repetition rates in connection with our observations of the recent commercial WiMAX network deployment in the Philadelphia market.

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<sup>8</sup> See e.g., Sirius XM’s April 23 Comments at Exhibit A.

<sup>9</sup> Horizon May 12 Letter at 2.

<sup>10</sup> See Letter from Paul J. Sinderbrand, Counsel to the WCS Coalition, to Julius Knapp, Ruth Milkman, and Mindel De La Torre, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 95-91 (filed March 31, 2010).

Imposing a network control to limit individual WCS handsets from transmitting in every other up-link frame would indeed reduce the handset's duty cycle from 38% to 19%, based on the staff's most recent proposals, but would not affect overall network throughput or fundamental operations.<sup>11</sup> At best, the WCS Coalition is inconsistent in simultaneously arguing that probability of interference is low because mobile devices would transmit infrequently while arguing that uplink bandwidth should be unlimited.<sup>12</sup> And, as shown in tests performed by Sirius XM, the modification would help minimize interference to satellite radio significantly. The staff should adopt this limitation on uplink transmissions in recognition that this spectrum is unique in having satellite service directly adjacent to a terrestrial mobile service.

Our desire to avoid these 11<sup>th</sup> hour debates is why Sirius XM invited the WCS Coalition more than two years ago to participate in independent, third party testing performed under the watchful eye of the FCC staff.<sup>13</sup> While both sides may have debated the outcome of such tests, at least we would not still be discussing what was actually tested and measured. Now, we are instead left with the imperfect results from Ashburn where both sides are still unclear exactly what the other side was doing.<sup>14</sup> Rather than engaging in last minute debates, the Commission should take the time that is needed in this proceeding to ensure clarity regarding the parties' technical positions, especially as to a fundamental aspect of the Ashburn testing.

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<sup>11</sup> The available literature on WiMAX confirms that this parameter can be controlled by the network. *See* WiMAX System Evaluation Methodology Version 2.1, July 7, 2008, at page 76 ("... since the resource allocation information is conveyed in the MAP messages at the beginning of each frame, the scheduler can effectively change the resource allocation on a frame-by-frame basis to adapt to the bursty nature of the traffic. With fast air link, asymmetric downlink/uplink capability, fine resource granularity and a flexible resource allocation mechanism, Mobile WiMAX networks can meet QoS requirements for a wide range of data services and applications.") This volume is available at [http://www.cse.wustl.edu/~jain/wimax/ftp/wimax\\_system\\_evaluation\\_methodology\\_v2\\_1.pdf](http://www.cse.wustl.edu/~jain/wimax/ftp/wimax_system_evaluation_methodology_v2_1.pdf).

<sup>12</sup> *See e.g.*, Letter from Jennifer M. McCarthy, NextWave Wireless Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, submitted November 16, 2008 at Attachment, p. 3.

<sup>13</sup> Letter from Patrick L. Donnelly and James S. Blitz to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-293, IB Docket No. 95-91, submitted February 28, 2008.

<sup>14</sup> Despite several requests from Sirius XM, including in joint meetings with the FCC staff, the WCS Coalition has never provided the technical logs from its Ashburn demonstrations. This lack of cooperation belies the "open and transparent" characterization of the Ashburn tests provided by the WCS Coalition in its most recent filing. Even with this lack of transparency, the WCS Coalition's tests of high bandwidth application did mute satellite radio reception in one instance and caused audible degradation in another. WCS Coalition's Ashburn Summary at Exhibit A, page 2.

Thank you for your attention to these matters.

Respectfully submitted,

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